Toys ‘n’ More
Power Wheels

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Overall Project Design

- Power Wheels® cars were purchased, given to the students (each team received one vehicle) in EDSGN 100 (typically first year students).

- The teams were asked to ‘reverse engineer the vehicles e.g. determine how the power was supplied to the vehicle, examine the transmission, steering mechanism etc.

- Support from students in CMPEN 271 and EE 210 (electrical, power, control, computer)
Powerwheels Car
Powerwheels Car
Project Design

- Accelerometers and velocity sensors were mounted on the vehicles.
  - Distance traveled, velocity and acceleration could be measured on board the vehicles.
  - Graphs were generated of these quantities
    - PASCO Instrumentation was used to measure and record the data.
Initially the EDSGN 100 students ‘fixed’ the steering (vehicle only goes straight)

Sensor mounted on hood measured vehicle velocity

CMPEN 271 (fall 2009) students created "user instructions" to convert cars to remote control. EE 210 students cooperated in Spring 2010. Servomotor steering and ESC variable speed
Powerwheels Car
Powerwheels Car

ON/OFF

FWD/REV

6V

M

M
Powerwheels Car

ESC

M

M

VEX µC

VEX R/C REC

VEX R/C TRANS

operator

motors

6v
Project Design

- The toy car platform was then modified to support radio control of vehicle operations.

- Semi-autonomous operation and vehicle response to sensors (such as an ultrasonic distance sensor) under computer control.
Students designed a mechanical **steering system** (gears and chain drive) that was radio controlled.

This flexibility allows this electric car platform to support a wide range of **future experimentation** and design projects.
Powerwheels Car

Future Directions?
Powerwheels Car

Show Video

Any Questions?